

FIRE HOSE HAVING ILLUMINATED SLEEVE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims benefit under 35 U.S.C. Section 120 of U.S. Provisional Application 60/458,772, filed March 28, 2003 and entitled "Illuminating Fire Hose With Fabric Sleeve," the disclosure of which is hereby incorporated by reference herein. The present application relates to commonly owned U.S. Patent 6,257,750, the disclosure of which is hereby incorporated by reference herein.

SEQUENCE LISTING

[0002] The present invention is generally related to safety devices for firefighters and is more particularly directed to firefighting hoses having safety devices associated therewith for assisting firefighters in locating the fire hose and exiting from darkened and/or smoked-filled rooms or buildings.

BACKGROUND OF THE INVENTION

[0003] When fighting a fire in a burning building, it is easy for a firefighter to become disoriented and/or lose his or her sense of direction. This is particularly true when an individual is in a dark or smoke-filled room. Unfortunately, there have been far too many incidences of firefighters becoming disoriented inside burning buildings, resulting in injuries and deaths. It is estimated that about 37.5 percent of firefighter fatalities are related to asphyxiation, due to the firefighter losing contact with the hose line and then running out of air. In many instances, firefighters become disoriented only a few feet away from the hose line.

[0004] Thus, a significant amount of effort has been directed to improving safety conditions for firefighters. Among these

efforts is U.S. Design Patent 382,501 to Clement, which teaches a direction-indicating band attachable to the exterior surface of a firefighting hose to direct an individual toward the exit of a building. U.S. Patent 4,844,000 to Clement discloses a direction-indicating clamp that may be attached to a firefighting hose. The direction-indicating clamp partially surrounds the hose with an elongated band. The band has protruding fingers that point toward the exit of the building.

[0005] U.S. Patent 5,027,741 to Smith et al. discloses another firefighting hose, which indicates an escape route from a fire. The firefighting hose is a conventional hose having an outer surface of fire resistant fibers that are woven into the exterior canvas surface of the hose. The fibers are generally stiff so as to maintain a substantially constant angle with respect to the exterior surface of the hose, thereby forming a brush surface surrounding the hose. The brush surface is rough to the touch in the direction of the fire and smooth to the touch in the opposing direction, i.e., the direction to the exit of the building.

[0006] U.S. Patent 5,623,890 to Lenske discloses a firefighting hose having a coupling that indicates the direction to the exit of a building. The coupling has a cylindrical body with a plurality of lugs attached to the outside surface of the cylindrical body. Each lug features directional extensions and a raised indicia (e.g., the word "exit") to direct the firefighter to the exit. The coupling component has a threaded extension so that the component may be threaded to a female coupling component.

[0007] U.S. Patent 6,257,750 to Strasser et al. discloses an illuminating fire hose including a fire hose having a first end, a second end, an interior wall and an exterior wall remote from

the interior wall. The fire hose has at least one light emitting element exposed at the exterior surface of the fire hose for selectively emanating light. In certain preferred embodiments, the light emitting element is attached to the exterior surface of the fire hose using an adhesive or securing threads for sewing the light emitting element to the exterior surface of the hose. In preferred embodiments, the light emitting element includes a fiber optic cable, a chemiluminescent cable or a series of light emitting diodes. During a fire-fighting operation, the illuminating fire hose emanates visible light so as to enable a firefighter to quickly locate the hose. The illuminating fire hose also enables a lost or disoriented firefighter to quickly locate the hose in a dark and/or smoke filled environment, thereby providing an escape line. The illuminating fire hose also enables a Firefighter Assistance and Search Team to follow a light path to quickly locate a lost or trapped individual.

[0008] In spite of the above advances, there remains a need for firefighting hoses having illuminating, visual indicia for enabling firefighters to locate fire hoses and follow the visual indicia to the exit of a building.

SUMMARY OF THE INVENTION

[0009] Preferred embodiments of the present invention are preferably directed to providing an illuminating fire hose, which emanates visible light to enable a firefighter to quickly locate the hose in a dark and/or smoke-filled environment. The present invention may also provide a life-line for a trapped firefighter, whereby a rescue or search team may follow a light path to locate the trapped individual.

[0010] In accordance with certain preferred embodiments of the present invention, an illuminating fire hose includes a fire

hose, such as a standard fire hose having an interior section that contacts water and an exterior surface remote therefrom. Preferred fire hoses include those having an inner hose section comprising rubber and an outer hose section comprising canvas, polyester, or any other material able to withstand the heat of a fire, that is securable (e.g. bonded) to the exterior surface of the rubber hose section. The hoses also preferably have metallic male and female hose couplings so that the hoses may be coupled to a water source and/or to the couplings of other fire hoses. The fire hose may also include two or more hose sections, each hose section having a first end and a second end remote therefrom. Each end of the fire hose preferably has one of the above-mentioned male and/or female hose couplings.

[0011] The illuminating fire hose also preferably includes at least one light emitting element exposed at the exterior surface of the hose. As used herein, the term "light emitting element" means any element that is capable of emanating light or illuminating. The light emitting element may also be continuously exposed at the exterior surface of the hose so that the entire length of the light emitting element is visible at the exterior surface of the hose. In certain preferred embodiments, it is desirable that the light emitting element be exposed along the entire length of the fire hose so that a trapped and/or disoriented firefighter may easily locate the fire hose by visually observing the light projecting from the light emitting element. The light emitting element may be one or more fiber optic fibers, a fiber optic cable, a chemiluminescent cable or line, or a series of light emitting diodes. The light emitting element may also be an electroluminescent cable or line secured outside the fire hose. One preferred electroluminescent cable is sold by Lumanex, L.L.C. of Delray Beach, Florida, having a web address at

www.lumanex.com, the disclosure of which is hereby incorporated by reference herein.

[0012] The light emitting element may be attached to the exterior surface of the fire hose by an adhesive, such as an epoxy adhesive. The adhesive is preferably flexible so that the hose may bend and flex during use without detaching the light emitting element from the exterior surface of the hose. In certain preferred embodiments, the adhesive is substantially transparent so that light emanating from the light emitting element may pass through the adhesive. In other preferred embodiments, the light emitting element is attached to the exterior surface of the fire hose by sewing the element to the outer surface of the hose. In one preferred embodiment, fibers or monofilaments are used for sewing the element to the exterior surface of the hose. The monofilaments may be substantially transparent. In still other embodiments, the light emitting element may include one or more individual optical fiber cables that are woven into the outer jacket of the hose.

[0013] In certain preferred embodiments, the overall length of the light emitting element is longer than the distance between the first and second ends of the fire hose. In these particular embodiments, the light emitting element may have a first end attached to the hose, adjacent a first end of the hose. The light emitting element then extends away from the first end of the hose toward the second end. At the second end of the hose, the light emitting element preferably loops back on itself at a looped portion of the light emitting element and then extends back toward the first end of the fire hose. When the light emitting element is a fiber optic cable or one or more fiber optic fibers, a first end and/or a second end of the fiber optic cable may be optically coupled with a light source for transmitting light through the fiber optic cable. The light

transmitted through the fiber optic cable then emanates from the sidewalls of the cable to provide visible lighting along the exterior surface of the hose. This visible light is particularly helpful when a firefighter must quickly locate the fire hose in a dark and/or smoke-filled room.

[0014] In another preferred embodiment, the light emitting element is wrapped around and attached to the exterior surface of the fire hose in a coil-like configuration. Thus, the light emitting element provides illumination completely around the exterior surface of the fire hose. This embodiment may be particularly useful for illuminating fire hoses having two or more fire hose sections coupled to one another.

[0015] In certain preferred embodiments, a light source such as a laser device creates light that is transmitted through one or more fiber optic cables attached to one or more fire hoses. The light source may be attached to an optical coupler or connector having multiple receiver ports for receiving the ends of the optical fiber cables for optically coupling the fiber optic cables with the light source. As a result, light created by the light source may be transmitted through the fiber optic cables to provide light along the exterior surfaces of the fire hoses.

[0016] In certain preferred embodiments, an end of a fiber optic cable terminates adjacent an end of a fire hose. The end of the fiber optic cable is optically coupled with a reflective element such as a reflective end cap that reflects the light emanating from the end of the fiber optic cable. The light emanating from the reflective end cap may have a brighter intensity than the light emanating from the side walls of the fiber optic cables. The reflective end cap is particularly useful for assisting firefighters in locating an end of a fire hose. This may be particularly useful for coupling the end of

the fire hose to another fire hose and/or quickly spotting the end of the fire hose so as to find the exit of a building.

[0017] In certain preferred embodiments, the light emitting element may incorporate chemiluminescent technology whereby two or more chemicals are mixed together to produce illumination. Items incorporating chemiluminescent technology are commonly sold under the trademarks CYALUME® and SNAPLIGHT®. In this particular embodiment, a line or cable may be attached to the exterior surface of a fire hose. During a fire, the line or cable may be bent so as to mix two or more chemicals together to produce illuminating light.

[0018] In yet further preferred embodiments, a color wheel or color filter may be used to change the color of the light passing through the light emitting element. In these embodiments, different colors may be used to send different messages along the length of the hose. For example, the color green may mean "all clear" and the color red may be a signal to evacuate a building.

[0019] In other preferred embodiments, the light emitting element may include a series of light emitting diodes that are exposed at the exterior surface of the firefighting hose. The series of light emitting diodes may include a clear protective strip overlying a series of individual light emitting diodes. The individual light emitting diodes are preferably interconnected with one another by a conductive trace. The light emitting diodes may have different colors such as white, red, green, yellow, orange and blue. These colors may be selectively activated to provide firefighters with a message. For example, the green diodes may be activated to indicate that conditions within a burning building are safe. However, the red diodes may be activated to provide an indication that an emergency condition exists within the building and that

firefighters should exit the building as quickly as possible. The light emitting diodes may also be selectively activated to provide a pulse of light which moves toward the first end of the fire hose to indicate the direction to the first end. This may be particularly useful for disoriented firefighters who are able to locate the fire hose, yet have no indication as to which end of the hose is the first end.

[0020] In still other preferred embodiments of the present invention, a combination includes a fire hose having a first end and a second end, an interior wall and an exterior wall remote from the interior wall. The combination includes one or more fiber optic fibers attached to the exterior surface of the fire hose. The fiber optic cable extends between the first and the second ends of the fire hose and is preferably continuously exposed at the exterior surface of the fire hose. The combination also preferable includes a light source that is optically coupled to at least one end of the fiber optic cable for transmitting light through the fiber optic cable. The transmitted light is preferable visible along substantially an entire length of the fiber optic cable and substantially the entire length of the hose. In operation, the combination provides visible light emanating from a fire hose that may be seen by individuals working in darkened and/or smoke-filled rooms. The individuals may rely on the visual light to identify the location of the fire hose and to follow the light path to the exit of a building.

[0021] In other preferred embodiments of the present invention, an illuminating fire hose may include a fire hose having a first end, a second end, an interior wall and an exterior wall remote therefrom. The hose may also have a sleeve secured over the exterior surface of the fire hose, the sleeve carrying at least one light emitting element adapted for

selectively emanating light. The sleeve may be made of a flexible material such as a fabric sleeve. In preferred embodiments, the sleeve has first and second edges extending between first and second ends thereof, the first and second edges being connectable to one another for securing the sleeve over the exterior surface of the hose. When the sleeve is secured over the exterior surface of the hose, the first and second edges of the sleeve may overlap one another. The first and second edges may include a fastening material such as a hook and loop fastening material. One preferred hook and loop fastening material is sold under the trademark VELCRO. Other preferred fasteners may include zippers, buttons and snaps.

[0022] The illuminating fire hose may also include a clear material attached to the sleeve that is adapted to hold at least one light emitting element. In preferred embodiments, the clear material is a polymer material. The clear material may be adhered or sewn to the sleeve. One preferred adhesive may be an epoxy adhesive, such as a substantially transparent epoxy adhesive. The light emitting element may be sewn to the sleeve using stitching or securing fibers wrapped around the at least one light emitting element for securing the at least one light emitting element to the sleeve. The one or more securing fibers may include substantially transparent monofilaments.

[0023] In certain preferred embodiments, the light emitting element has electroluminescent properties. One highly preferred light emitting element is an electroluminescent cable sold by Lumanex, L.L.C. of Delray Beach, Florida. The electroluminescent cable is preferably coupled with a power source such as a battery or electrical transformer for activating the cable and generating light. The light is preferably generated in a plurality of colors such as aqua,

blue, green, orange, yellow, lime and red. The light may be strobed or sequenced for passing signals through the cable.

[0024] In other preferred embodiments, an illuminating hose includes a hose having a first end, a second end, an interior wall and an exterior wall, and a sleeve secured over the exterior surface of the hose, the sleeve carrying at least one light emitting element adapted to selectively emanate light from said hose. The light emitting element desirably generates pulses of visible light that indicate a direction to one of the ends of the fire hose. The light emitting element is desirably visible between the first and second ends of the hose.

[0025] In still other preferred embodiments of the present invention, a combination includes a fire hose having a first end, a second end, an interior wall and an exterior wall remote from the interior wall, and a material sleeve secured over the exterior wall of the fire hose, the sleeve carrying a electroluminescent material that is activated for illuminating light. The combination also preferably includes a power source such as a battery or electrical transformer that is coupled with the electroluminescent cable, the power source being operable for activating the electroluminescent material so as to generate and illuminate light from the cable.

[0026] These and other preferred embodiments are described in more detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] FIG. 1 shows a perspective view of a firefighting system including illuminating fire hoses, in accordance with certain preferred embodiments of the present invention.

[0028] FIG. 2 shows an expanded view of a section of FIG. 1 including a light source and an optical coupler, in accordance with certain preferred embodiments of the present invention.

[0029] FIG. 3A shows a cross-sectional view of a firefighting hose including a fiber optic cable attached to an exterior surface of the hose, in accordance with certain preferred embodiments of the present invention.

[0030] FIG. 3B shows a cross-sectional view of a firefighting hose including a fiber optic cable attached to an exterior surface of the hose, in accordance with another preferred embodiment of the present invention.

[0031] FIG. 4A shows a fragmentary view of a first one of the illuminating fire hoses of FIG. 1 including a fiber optic cable attached to the exterior surface of the hose, in accordance with certain preferred embodiments of the present invention.

[0032] FIG. 4B shows an expanded view of a portion of the first fire hose shown in FIG. 4A.

[0033] FIG. 5A shows a fragmentary view of a second one of the illuminating fire hoses of FIG. 1 including a fiber optic cable wrapped around and attached to the exterior surface of the hose, in accordance with further preferred embodiments of the present invention.

[0034] FIG. 5B shows an expanded view of a portion of the second illuminated fire hose shown in FIG. 5A including an interface between the ends of two adjacent fiber optic cables that are optically coupled together.

[0035] FIG. 6 shows a perspective view of a portion of an illuminated fire hose including an optical fiber attached to an exterior surface of the hose and a reflective end cap attached to an end of the optical fiber, in accordance with still further preferred embodiments of the present invention.

[0036] FIG. 7A shows a fragmentary view of an illuminating fire hose having optical fibers woven into an outer section of the hose.

[0037] FIG. 7B shows a fragmentary view of an illuminating fire hose having optical fibers woven into an outer section of the hose, in accordance with further preferred embodiments of the present invention.

[0038] FIG. 8 shows a top fragmentary view of an illuminating fire hose including a series of light emitting diodes attached to the fire hose, in accordance with still further preferred embodiments of the present invention.

[0039] FIG. 9 shows a top fragmentary view of an illuminating fire hose including an optical fiber cable attached to the fire hose, the optical, in accordance with still further preferred embodiments of the present invention.

[0040] FIG. 10 shows a material sleeve that carries a light emitting element for a fire hose, in accordance with certain preferred embodiments of the present invention.

[0041] FIG. 11 shows the material sleeve of FIG. 10 being secured over the exterior surface of a fire hose.

[0042] FIG. 12 shows opposing edges of the material sleeve of FIG. 10 being secured together over the exterior surface of a fire hose, in accordance with certain preferred embodiments of the present invention.

DETAILED DESCRIPTION

[0043] FIG. 1 shows a top view of an illuminating system for fire hoses in accordance with certain preferred embodiments of the present invention. The illuminating system 10 includes a source of water 12, such as a fire truck or fire hydrant, having a platform 14 for receiving one or more fire hoses 16, 116. In the particular embodiment shown in FIG. 1, the platform 14 includes water supply coupling 18 for the first fire hose 16 and a second water supply coupling 20 for the second fire hose 116. The first fire hose 16 includes a first end 22 that is coupled to first water supply coupling 18 and a second end 24 remote therefrom. The second end 24 of the first hose 16 is coupled with a nozzle 26 having control handle 28 for opening and closing the spray. A light emitting element such as a fiber optic cable 30 extends along the entire exterior surface of the fire hose 16. Although the light emitting element in this particular embodiment includes a fiber optic cable, it is contemplated that the light emitting element may also include a chemiluminescent line or a series of light emitting diodes. As will be described in more detail below, fiber optic cable 30 is preferably attached to the exterior surface of fire hose 16 by an adhesive, such as an epoxy adhesive that is substantially transparent for allowing light to pass therethrough.

[0044] Referring to FIGS. 1 and 2, one or more ends of the fiber optic cable 30 are optically coupled with a light source 34. The light source 34 preferably includes a laser device or one or more light generators for creating light that will be transmitted through the fiber optic cable 30. In certain preferred embodiments, the light source 34 includes a color wheel or color filter (not shown) that allows an operator to

selectively modify the color of the light transmitted through the fiber optic cable 30. The light source 34 also preferably includes a multiport optical coupler 36 attached thereto that is adapted for forming an optical linkage between the light source 34 and the ends of fiber optic cable 30. In the particular embodiment shown in FIG. 2, the multiport optical coupler 36 includes at least three ports or receptacles for receiving the ends of fiber optic cables. The optical fiber 30 attached to the exterior surface of first fire hose 16 has a first end 38 optically coupled with optical coupler 36. The fiber optic cable 30 then extends along the exterior surface of the hose toward the second end 24 of the fire hose 16. Near the second end 24 of the fire hose, fiber optic cable 30 loops back, preferably at loop portion 40 and then extends back toward the first end 22 of fire hose 16. Fiber optic cable 30 terminates at second end 42, which is also optically coupled to light source 34 via optical coupler 36. Thus, both the first and second ends 38, 42 of the fiber optic cable 30 are coupled with light source 34 via optical coupler 36.

[0045] During operation of illuminating fire hose 16, the water source 12 provides water which is pumped through hose 16 to nozzle end 26. When the first end 22 of hose 16 is coupled to water source 12, the ends of fiber optic cable 30 are also coupled to light source 34 via optical coupler 36. The light source 34 provides light that is transmitted through the entire length of optical fiber cable 30 so as to provide visible light at the exterior surface of the fire hose 16. As a result, a firefighter in a dark or smoke filled room will be able to see the light emanating from the fiber optic cable for determining the location of the hose and then follow the fire hose to the exit of the a room or building.

[0046] FIG. 1 also shows a second embodiment of an illuminating fire hose having an optical fiber cable wrapped around and attached to the exterior surface of the hose in a coil-like manner. The second fire hose 116 has a first end 122 coupled to water source 12 at water source coupling 20. Second fire hose 116 include a second end 124 remote therefrom having nozzle 126 attached thereto. Nozzle 126 includes nozzle control handle 128 for opening, closing and controlling the spray of water from nozzle 126. The exterior surface of second fire hose 116 includes optical fiber cable 130 attached to the exterior surface of the fire hose. The optical fiber cable 130 is wrapped around the exterior surface of second fire hose 116 in a coil-like manner so that the light transmitted through optical fiber cable 130 may be seen completely around the exterior surface of second fire hose 116. A first end of optical fiber cable 138 is coupled with light source 34 at optical coupler 36.

[0047] FIG. 3A shows one embodiment wherein fiber optic cable 30 is attached to the exterior surface of hose 16 using substantially transparent adhesive 32. The adhesive 32 is preferably flexible so that the fiber optic cable 30 remains attached to the hose when the hose flexes and bends.

[0048] FIG. 3B shows an illuminating fire hose 116 in accordance with another preferred embodiment of the present invention having fiber optic cable 130 attached to the exterior surface 117 thereof. The fiber optic cable 130 is secured to the exterior surface 117 of the fire hose by small threads or monofilaments 132 that are sewn into the fabric on the exterior surface 117 of the fire hose 116. As mentioned above, the light illuminating element attached to the hose may also comprise a chemiluminescent line wherein two or more chemicals mix together

to produce light, a series of light emitting diodes, or an electroluminescent cable or element.

[0049] FIGS. 4A and 4B show one preferred embodiment of the present invention having both ends of an optical fiber cable attached to a light source. Referring to FIG. 4A, fire hose 16 has optical fiber cable 30 attached to the exterior surface thereof. Adjacent the second end 24 of fire hose 16, fiber optic cable 30 loops back on itself at loop portion 40 and extends back toward the first end 22 of fire hose 16. The ends of the optical fiber cable are attached to the optical coupler 36 shown in FIGS. 1 and 2. Fiber optic cable may be attached to the exterior surface of fire hose 16 by a wide variety of methods including using an adhesive, such as a transparent adhesive, sewing the fiber optic cable to the exterior surface of the hose using fibers or monofilaments, or molding the fiber optic cable into the exterior wall of a rubberized, jacketed fire hose.

[0050] In certain embodiments, it may be necessary to attach one or more fire hoses together to form a longer hose and extend the operational range of the firefighters operating the hose. Referring to FIGS. 5A and 5B, fire hose 116 has second end 124 including coupler 140. An optical fiber cable 130 is attached to the exterior surface of the hose 116. Optical fiber cable 130 is wrapped around the exterior surface of fire hose 116 in a coil-like manner or configuration. The fire hose 116 is coupled with fire hose extension 216 having a first end 222 including coupler 240. Fire hose extension 216 also has an optical fiber cable 230 attached to the exterior surface thereof and wrapped around the exterior surface of extension fire hose 216 in a coil-like configuration. The opposing ends of fiber optic cables 130 and 230 are optically coupled to one another via an

optical connector 236 that receives opposing ends of the fiber optic cables 130 and 230. Although FIGS. 5A and 5B show two fire hoses connected together, other preferred embodiments of the present invention may have three, four or an infinite number of fire hoses coupled together. In the longer hoses, the opposing ends of all of the optical fiber cables may be optically coupled together so that light transmitted through a first optical fiber cable may continue in a downstream direction through the remaining fiber optic cables. As a result, firefighters may extend their operational range while maintaining visual contact with the light emanating from the optical fiber cables attached to the exterior surfaces of the hose sections.

[0051] FIG. 6 shows an illuminating fire hose 316 in accordance yet further preferred embodiments of the present invention. Illuminating fire hose 316 has a first end 322 and a second end 324 remote therefrom. The second end 324 of hose 316 has a coupler 340 attached thereto for attaching the second end of the hose to another fire hose. A light-emitting fiber optic cable 330 is attached to the exterior surface 317 of fire hose 316. The fiber optic cable 330 may be attached to the exterior surface of fire hose 316 by an adhesive material, such as a transparent adhesive material which allows light to pass therethrough. The terminal end 342 of fiber optic cable 330 is attached to a reflecting end cap 344 which reflects the light transmitted through the end of fiber optic cable 330. The reflecting end cap 344 preferably reflects light back into the cable to help intensify the visible light throughout the length of the cable. Thus, by using a reflective end cap, a consistent level of light is provided throughout the length of the fiber optic cable and hose.

[0052] FIG. 7A shows an illuminating fire hose 416 in accordance with further preferred embodiments of the present invention including inner hose section 415 and outer hose section 417. The inner hose section 415 is preferably made of rubber and the outer hose section 417 is preferably made of a flexible, fire resistant material such as polyester. A plurality of optical fibers 430 are woven into the outer hose section 417. The plurality of optical fibers 430 are preferably exposed at an exterior surface 419 of the outer hose section 417. In operation, the optical fibers 430 may have light transmitted therethrough for providing illumination around the exterior surface of the fire hose 416. Fiber 7B shows a fire hose 416' in accordance with another preferred embodiment having optical fibers 430' woven into the outer hose section 417'. The spacing between the optical fibers 430' is less than the spacing shown in FIG. 7A.

[0053] FIG. 8 shows another preferred embodiment of the present invention wherein a series of light emitting diodes 530 are attached to an exterior surface 517 of illuminating fire hose 516. The series of light emitting diodes 530 comprise a transparent strip 548 adhered to the exterior surface 517 of hose 516. The transparent strip preferably covers the light emitting diodes. The series of light emitting diodes 530 also includes individual light emitting diodes 552 that are interconnected with one another via conductive trace 550. The series of light emitting diodes may emit only one color, such as red. However, in other preferred embodiments, some of the diodes may emit light of one color while other diodes of the series emit light of another color. In the particular preferred embodiment shown in FIG. 8, light emitting diode 552A emits red light, while light emitting diode 552B emits green light. Activation of the different colors may be used to transmit

messages to firefighters utilizing the fire hose 516. For example, activating green may indicate a safe condition. Activating red may indicate an unsafe condition. In addition, at different times the light emitting diodes 552 may be selectively activated to indicate the direction toward the first end 522 of fire hose 516. As a result, the light emitting diodes 552 will be activated from the second end 524 of fire hose toward the first end 522 of fire hose to provide firefighters with an indication of the direction to the first end 522 of fire hose 516. As a result, a disoriented or confused firefighter may follow the light emitting diodes 552 when attempting to exit a room or building.

[0054] FIG. 9 shows another preferred embodiment of the present invention including fire hose 616 having a fiber optic cable 630 attached thereto. The fiber optic cable has an opaque sheathing around the outer surface thereof. The opaque sheathing provides an outline for one or more directional arrows 652 that point toward the direction of the exit of a room or building. When the fiber optic cable is illuminated, the arrows 652 will be illuminated to point toward the source end 624 of the hose 616 and away from the nozzle end 622 of the hose. Thus, a firefighter may follow the arrows to exit a building.

[0055] FIG. 10 shows a sleeve 750 having a clear material 752 stitched to the material sleeve 750 to hold a light emitting element 730 such as a fiber optic cable or an electroluminescent cable. The sleeve 750 is preferably made of a flexible material such as fabric. The clear material 752 is preferably a clear, flexible material such as a clear polyvinyl material. The clear material may be reinforced. The sleeve preferably includes a folded and stitched edging 754 on one side of material sleeve 750 and a second folded and stitched edging 756 on an opposite

side of material sleeve 750. The second edge 756 includes the hook side 758 of Velcro material and the first edge includes the loop side 760 of Velcro material. In certain preferred embodiments, the strip of Velcro material on the opposite edges is approximately two inches wide. In other preferred embodiments, loops and hooks and other types of fasteners such as zippers, buttons and snaps may be secured to the opposite edges of the material sleeve 750 for holding the sleeve edges secured together. The material sleeve 750 also preferably includes stitching 762 that holds the clear material 752 to the sleeve 750. In other preferred embodiments, the light emitting element 730 may be attached to the sleeve 750 using an adhesive or stitching, or any other means for holding a light emitting element to a sleeve.

[0056] FIG. 11 shows a fire hose 716 having a first end 722 and a second end 724 with a hose coupling 740. The above-described fabric material sleeve 750 is secured around an exterior surface of the hose 716 to enable a light emitting element 730 to be optically accessible or exposed at an exterior surface of the hose. The light emitting element preferably generates light that is able to pass through clear material 752 so that the light may be generated along the length of the hose.

[0057] FIG. 12 shows the opposite edges of material sleeve 752 being secured over the fire hose 716. In certain preferred embodiments, the opposing edges 754, 756 of the sleeve 750 are overlapped with one another so that the hook side 758 of the Velcro material engages the loop side 760 of the Velcro material. As a result, the sleeve 750 is reliably secured about the exterior surface of fire hose 716. The light generated by the light emitting element 730 is able to pass through the clear material 752. The light emitting element preferably loops back

upon itself and passes through another channel formed by the clear material 752, as shown in FIG. 11.

[0058] In highly preferred embodiments, the light emitting element is an electroluminescent cable or line that is coupled with battery or electric power for generating and illuminating light. The electroluminescent cable is preferably flexible so that it can flex and bend with the movement of a fire hose. The electroluminescent cable may be adapted to illuminate light of various colors such as aqua, blue, green, orange, yellow, lime and red. The cable may have a protective cover or jacket so as to protect the cable from stress, strain, shock, compression, UV light, heat and/or chemicals.

[0059] These and other variations and combinations of the features described above can be utilized without departing from the present invention as defined by the claims. For example, the present invention is not limited to fire hoses but can be utilized with any hose or conduit that transfers liquids, fluids, gasses, solids or any combination of liquids, fluids, gasses and solids. As such, the foregoing description of the preferred embodiments should be taken by way of illustration rather than by way of limitation of the claimed invention.